Small Business Innovation Research/Small Business Tech Transfer

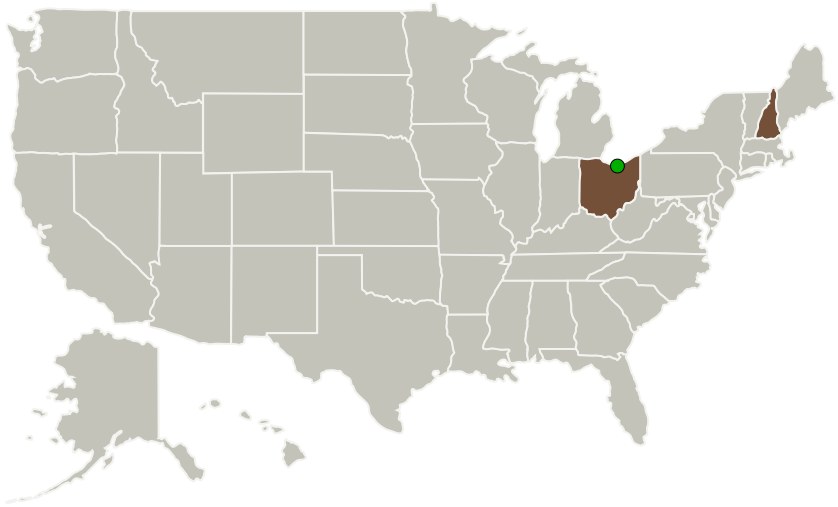
Space Evaporator Absorber Radiator for Life Support and Thermal Control Systems, Phase II

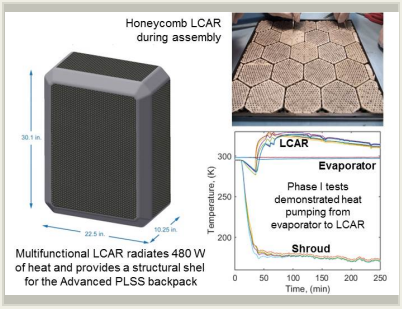
Completed Technology Project (2015 - 2018)

Project Introduction

Future human space exploration missions will require advanced life support technology that can operate across a wide range of applications and environments. Thermal control systems for space suits and spacecraft will need to meet critical requirements for water conservation and adaptability to highly variable thermal environments. To achieve these goals, we propose an International Space Station (ISS) demonstration program for an innovative Space Evaporator Absorber Radiator (SEAR) technology. A SEAR system comprises a lithium chloride absorber radiator (LCAR) for heat rejection coupled with a space water membrane evaporator (SWME) for heat acquisition. SEAR systems provide heat pumping to minimize radiator size, thermal storage to accommodate variable environmental conditions, and water absorption to minimize use of expendables. In Phase I we proved the feasibility of our approach by building and testing an LCAR with flight-like internal structures and designing an ISS demonstration experiment. In Phase II we will design and build SEAR components, a flight-like test module, and a regeneration system according to ISS flight requirements. We will demonstrate their operation in ground tests that simulate flight test conditions.

Primary U.S. Work Locations and Key Partners





Space Evaporator Absorber Radiator for Life Support and Thermal Control Systems, Phase II Briefing Chart Image

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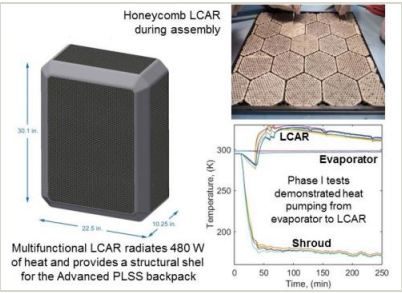
Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
New Hampshire	Ohio

Images



Briefing Chart Image
Space Evaporator Absorber Radiator for Life Support and Thermal Control Systems, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/135263)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Creare LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Michael G Izenson

Co-Investigator:
Michael Izenson

Space Evaporator Absorber Radiator for Life Support and Thermal Control Systems, Phase II

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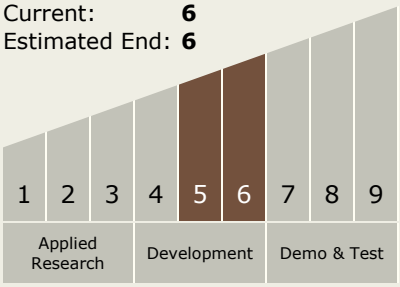
Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System